Class 05

Topics

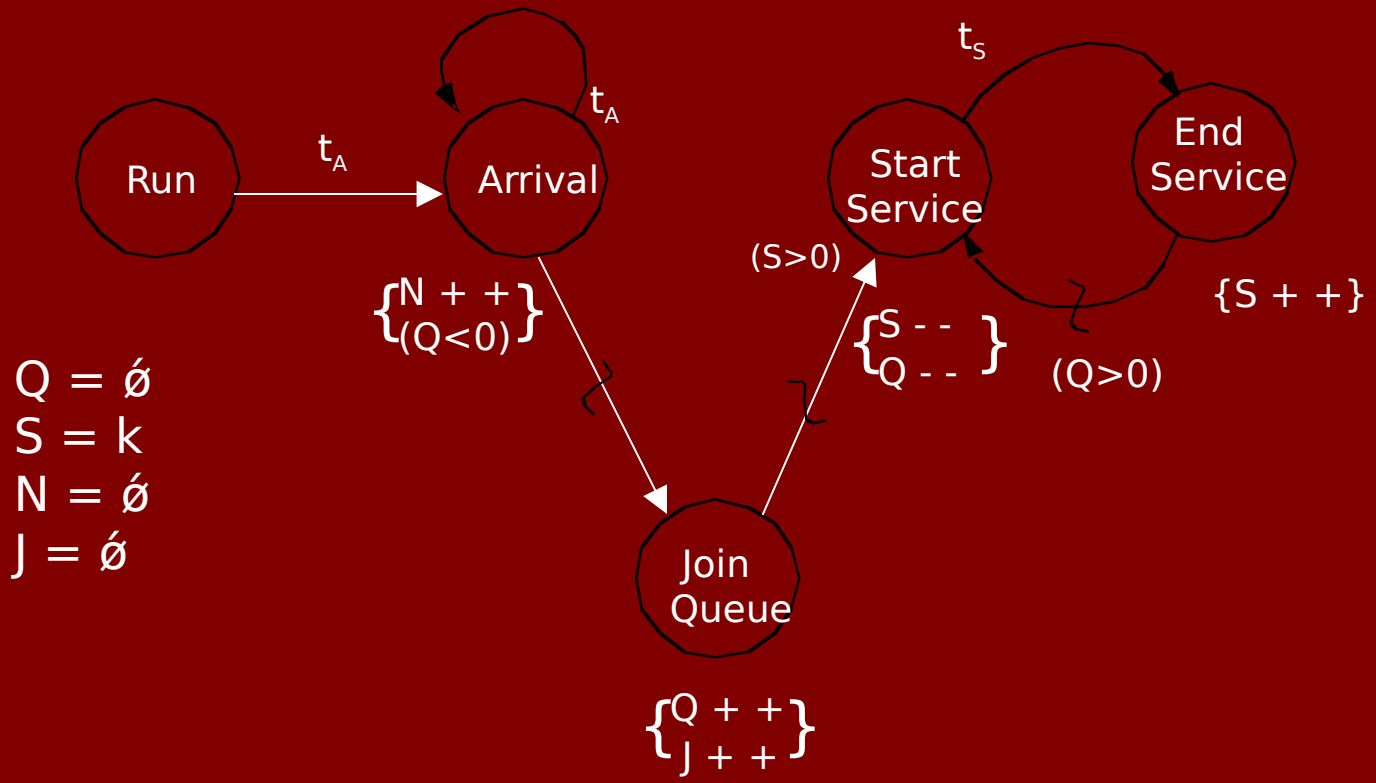
- Simplestats-like updating for time-varying mean
- More Event Graph Examples
  - Finite Waiting Room
  - No Queue
  - Tandem Queue
- Reading
- Basic Event Graph Modeling

Multiple Server Queue with Finite Capacity

- Parameters
  - {tA} interarrival times
  - {tS} service times
  - k # servers
  - c capacity of queue (C>0)

- State
  - Q = # in queue
  - S = available servers
  - N = # arrivals
  - J = # served

Event Graph


Run
t_A
Arrival
t_A
{N + +
(Q<0)}
Q = ø
S = k
N = ø
J = ø
Join
Queue
{Q + +
J + +}
(S>0)
Start
Service
t_S
End
Service
{S - -
Q - -}
(Q>0)
{S + +}

Multiple Server Queue With No Queue

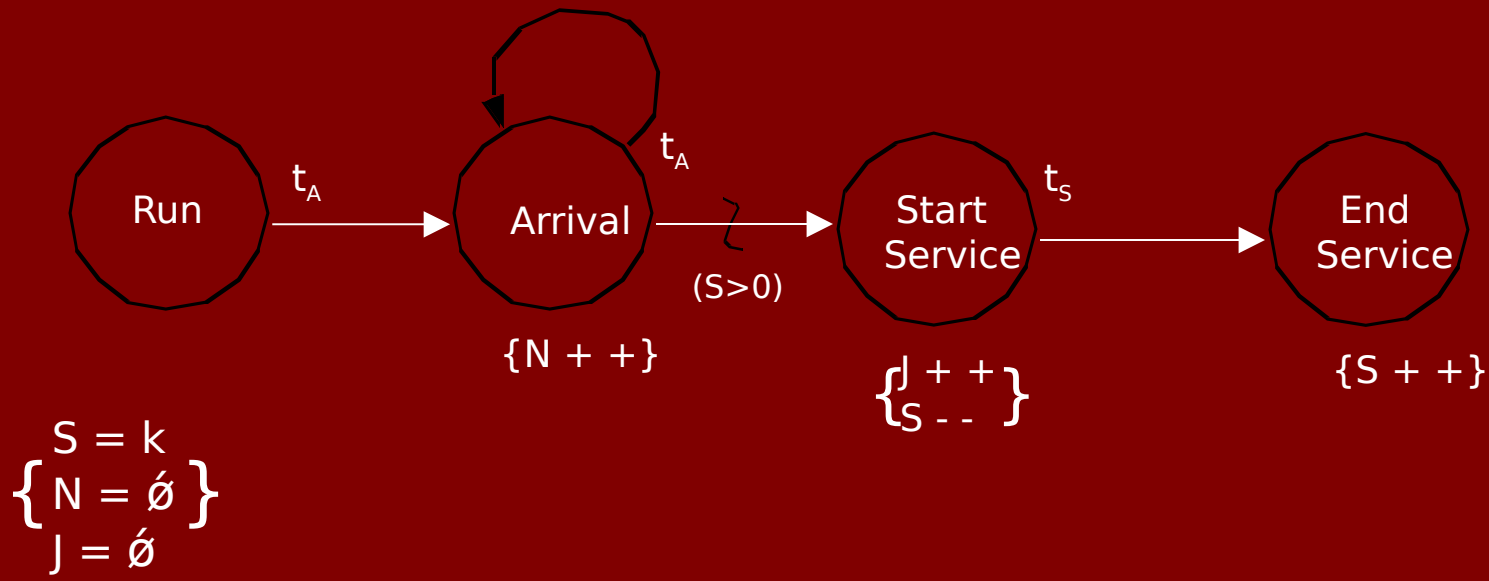
Parameters

- {tS} service times
- {tA}   interval times
- K   # servers

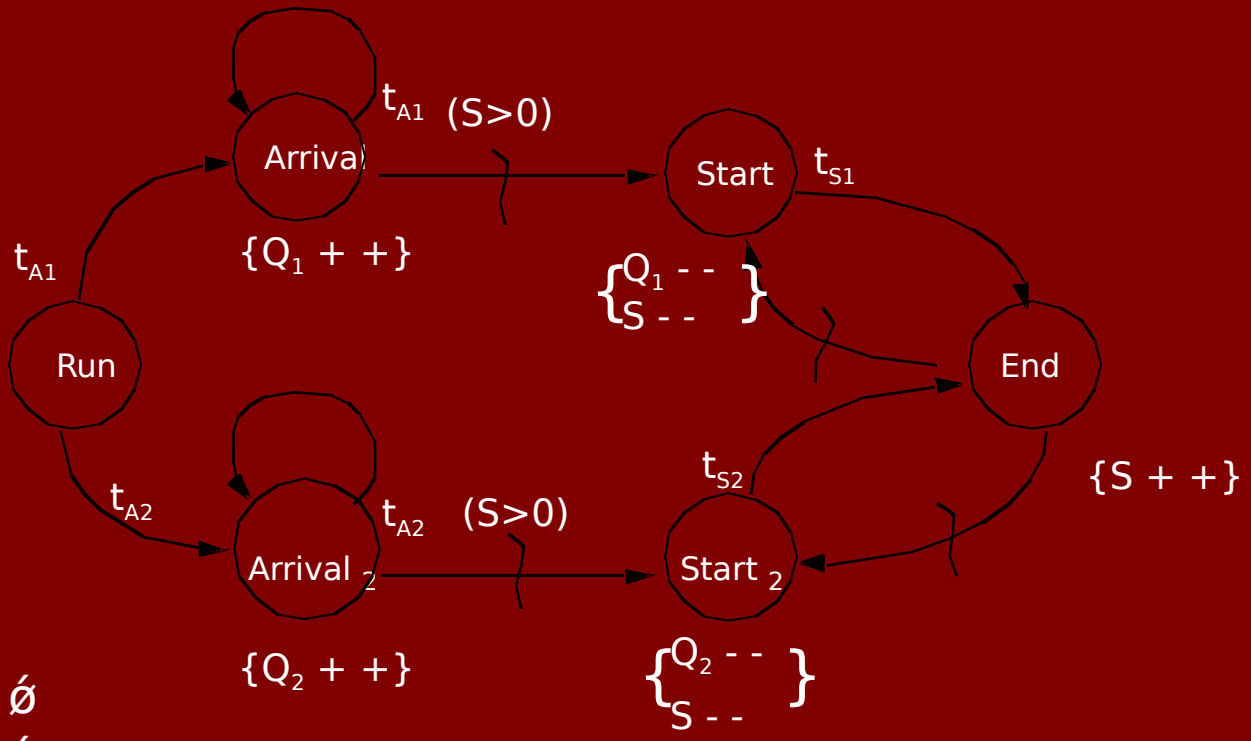
State

- S # available servers
- N # arrivals
- J # served

Event Graph


Run
t_A
Arrival
t_A
(S>0)
{N + +}
Start Service
t_S
{J + +
S - -}
End Service
{S + +}
S = k
{N = ø}
J = ø

Two Types of Customer, One Type of Server



$Q_1 = ø$
$Q_2 = ø$
$S = k$

Two Types of Customers, Two Different Service Times

- One type of server
- Priority to type 2 customers

Parameters

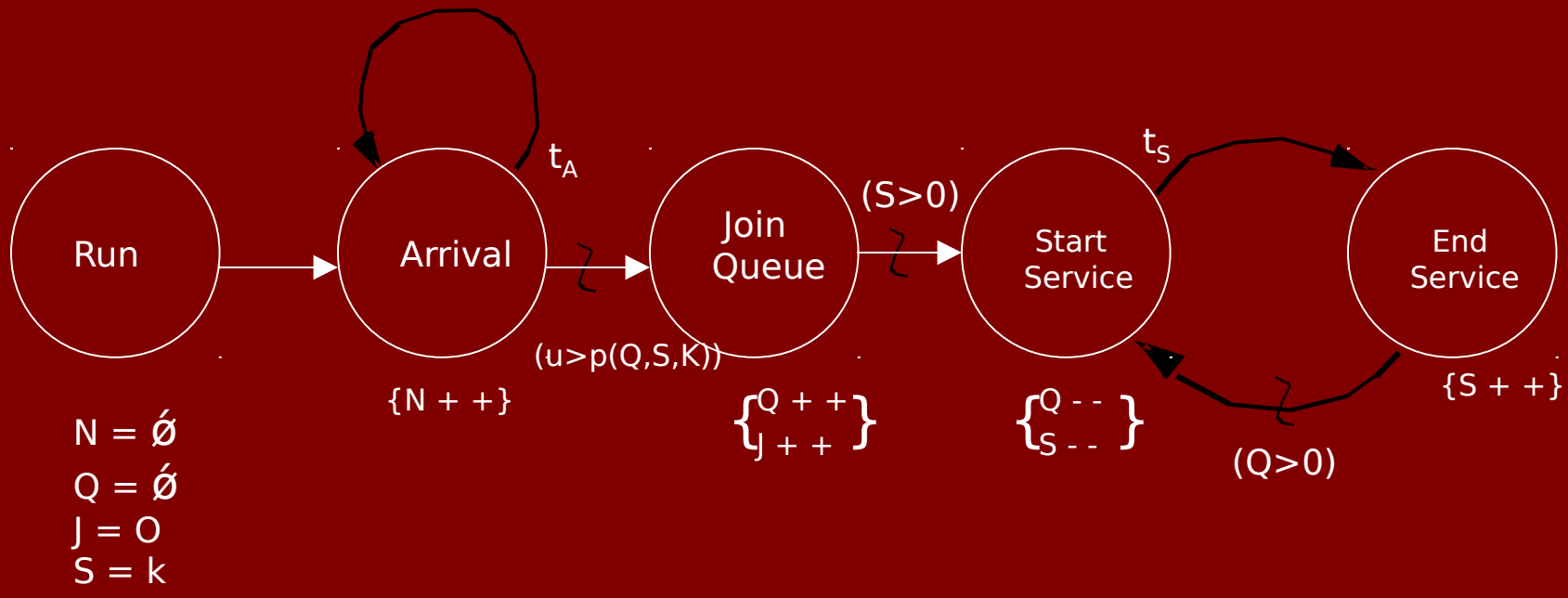
- $\{t_{Ai}\}$ interarrival times for customers of type i (i=1,2)
- $\{t_{Si}\}$ server times for customers of type i (i=1,2)
- k_i # servers of type i

State

- Q_i = # of customers of type i (i=1,2)
- S = # of available servers

Balking

- Arriving customer balks (i.e., choose not to join the system) with probability P(Q,S,K)



Parameters

- $\{t_A\}$ interarrival times
- $\{t_S\}$ service times
- K # servers
- {A} add??? Un (0,1)
- p(Q,S,K) P{Balk} as a function of Q,S,K

State

- N # potential customers
- J # customers who join the system
- Q # in system
- S # available servers